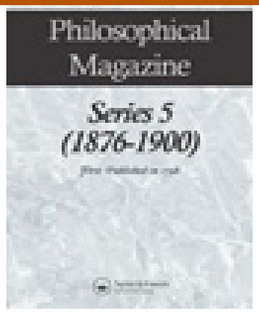

Philosophical Magazine Series 5

ISSN: 1941-5982 (Print) 1941-5990 (Online) Journal homepage: http://www.tandfonline.com/loi/tphm16

On a new metal, davyum

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To cite this article: Serge Kern (1877) On a new metal, davyum, Philosophical Magazine Series 5, 4:23, 158-159, DOI: 10.1080/14786447708639315

To link to this article: http://dx.doi.org/10.1080/14786447708639315

Published online: 13 May 2009.

is doubled, the increase of brightness of each line is, at the most, equal to that which would be produced by doubling the thickness of the flame, and is almost always inferior to it. We have to remark that the quantity of free metal in the flame is not necessarily proportional to the quantity of salt which it contains: it seems to follow from the comparison just made that it increases less quickly. I purpose to return to this point when I have finished the study of certain anomalies presented by these experiments.—*Comptes Rendus de l'Académie des Sciences*, July 9, 1877, tome lxxxv. pp. 70–72.

ON A NEW METAL, DAVYUM. BY SERGE KERN.

At the end of last month I succeeded in isolating a new metal belonging to the platinum group; I have named it *davyum*, in honour of Sir Humphry Davy the eminent English chemist.

The platiniferous sand treated had the following composition:—

Platinum	80·03
Iridium	9·15
Rhodium	0·61
Osmium	1·35
Palladium	1·20
Iron	6·45
Ruthenium	0·28
Copper	1·02
	100·09

For the separation of the metals, the ores (600 grammes) were treated by the analytical method of Professor Bunsen. The mother-liquors obtained after the separation of rhodium and iridium were heated with an excess of chloride and nitrate of ammonium. A deep-red precipitate was obtained; after calcination at a red heat it gave a greyish mass resembling platinum sponge. This, fused at the oxyhydrogen blowpipe, furnished a metallic ingot of a silver colour, and weighing 0·27 gramme. The density of davyum is 9·385 at 25° C.; the metal is hard, but malleable at a red-heat.

Davyum is readily attacked by aqua regia, and very slightly by boiling sulphuric acid. Caustic potash (KHO) produces a yellow precipitate. Sulphuretted hydrogen, passed through a dilute solution of chloride of davyum, produces a brown precipitate, which, after desiccation, takes a black colour. Sulphocyanide of potassium (KCyS), with a dilute solution of chloride of davyum, becomes red. This reaction is identical with that given by the salts of peroxide of iron. If the solutions of davyum and KCyS are concentrated, a red precipitate is obtained.

I think that, in the classification of the elements proposed by M. Mendeleeff, davyum is the hypothetical element placed between the metals molybdenum (Mo) and ruthenium (Ru). In that case the equivalent of davyum should be 100.

I hope to be able, in a few months, to communicate the results of my fresh investigations on the physical and chemical properties of davyum. The new metal appears to be a rare element in nature; platiniferous sand does not contain more than 0·045 of davyum.—*Comptes Rendus de l'Académie des Sciences*, July 9, 1877, tome lxxxv. p. 72.

ON THE DIAMAGNETISM OF CONDENSED HYDROGEN.

BY R. BLONDLOT.

Palladium charged with hydrogen acquires, as is known, the properties of a true alloy. After Graham had discovered this singular body, to which he gave the name of hydrogenium-palladium, he endeavoured to determine its physical constants. His examination extended to its magnetic properties; but there observation seemed to falsify completely the previsions of the illustrious chemist. In fact, it is known that palladium is feebly magnetic, while gaseous hydrogen was classed by E. Becquerel and Faraday among diamagnetic bodies; therefore, in palladium charged with hydrogen, one might have expected to meet with magnetic properties less marked than in palladium not charged. What happened was the opposite of this. Graham ascertained that a piece of palladium is attracted by the pole of a magnet much more powerfully after being impregnated with hydrogen by electrolysis*; and thence be concluded that hydrogenium-palladium is more magnetic than palladium.

G. Wiedemann, in reporting in his treatise on galvanism and electromagnetism† the preceding experiments, refuses to admit the conclusions drawn from them, attributing the phenomenon observed to the impurity of Graham's palladium, which "must have contained oxide of iron; the reduction of that oxide by the hydrogen exalted its magnetic properties—which accounts for the anomalies observed."

In view of this disagreement it seemed to us expedient to submit the question afresh to the test of experiment. The method we employed is that which was devised by M. Becquerel for the determination of specific magnetisms. The body for experiment, in the form of a small bar or strip, is suspended between the poles of the electromagnet by a torsion-thread so as to make a determinate angle with the line of the poles; the current is caused to pass; the bar is deflected; and to bring it back to its first position it is necessary to twist the thread at its upper part a certain angle, which, after suitable reductions, gives the measure of the specific magnetism sought.

* See *Comptes Rendus*, Jan. 18, 1869, p. 101; Phil. Mag. Feb. 1869, [4] vol. xxxvii. pp. 128, 129.

† *Die Lehre von Galvanismus und Electromagnetismus*, vol. ii. p. 553.